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GEOGRAPHICAL RECORD

NORTH AMERICA

A Drake Memorial on the California Coast. On June 25 a memorial was erected on the shores of Drake's Bay, some thirty miles northwest of the Golden Gate, to commemorate the landing there of Sir Francis Drake on June 17, 1579, on his memorable voyage of circumnavigation. The memorial is in the form of a redwood post, some ten feet high, bearing the brass plate of which a photograph is herewith reproduced. This post is in a measure a replica of the one set up by Drake before his departure from the bay on June 23. An Elizabethan shilling has been inserted in the plate to represent the coin which, as Francis Fletcher, chaplain of the *Golden Hinde*, tells us, the original tablet bore: "... together with her highnesse picture and armes, in a piece of sixpence currant English monie, shewing itselfe by a hole made of purpose through the plate."

The post was erected with appropriate ceremonies by the Sir Francis Drake Association, a body of persons interested in commemorating Drake's voyage as a milestone in the history of the discovery of California. To the secretary of the association, Miss Josephine M. Hyde, the Society is indebted for the above account and the accompanying illustration. Similar ceremonies had been held on the same spot on the two years previous. An early advocate of a Drake memorial in California was the Rt. Rev. William Ford Nichols, Bishop of California, who, early in the nineties, urged the erection of a monument, particularly to commemorate the fact that Fletcher, the said chaplain, was the first to conduct a Christian service in the English tongue and the first to use the Book of Common Prayer within the present territory of the United States. Bishop Nichols' purpose was ultimately accomplished through the generosity of Mr. George W. Childs of Philadelphia, by whose gift a stately monument, known as the "Prayer Book Cross," was established and dedicated on January 1, 1894, not at Drake's landing place, as at first proposed, but on a well-chosen site in Golden Gate Park in San Francisco between the city and the ocean shore.

Drake's landing on the California coast was made, it will be recalled, on that memorable voyage when so many Spanish galleons fell into his hands off the western coast of South America. Although having come by way of the Straits of Magellan, he did not wish to return to England by that route for fear that the Spaniards, roused by his exploits, would lie in wait for him. He therefore decided to seek a passage from the Pacific to the Atlantic by sailing to the northward and then to the eastward. Accordingly in March, 1579, he set forth from the Bay of Panama and, proceeding in a northwesterly direction, for more than two months traversed unknown and trackless waters, sailing more than a thousand leagues without seeing land. By this time he had entered the region of the prevailing northwesterly summer winds of the North Pacific with their attendant cold and fog and was thus finally, in latitude 42°, forced to put about and run in shore. He struck the coast at the mouth of the small Chetko River, at the present boundary between Oregon and California, but, as this open roadstead afforded no protection, continued southward along the coast until he found a bay protected by a headland against the northwest. This was the bay that now bears his name. He himself named the contiguous territory Nova Albion, reminded of England by the similarity of the coast to the white cliffs of his native Devon.

The theory has also been advanced that Drake anchored in San Francisco Bay (Edward Everett Hale in Winsor's "Narrative and Critical History of America," Vol. 3, 1884). The improbability of this assumption has been ably demonstrated by

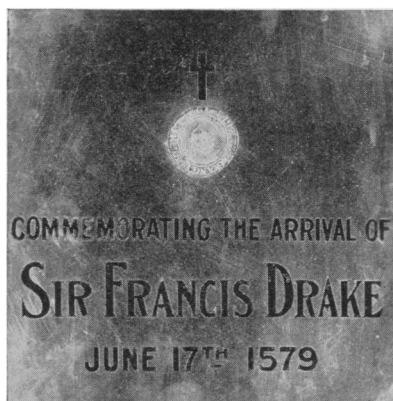


FIG. 1.—Brass plate on redwood post erected on June 25, 1916, at Drake's Bay, California, by the Sir Francis Drake Association to commemorate Drake's landing there in 1579.

Professor George Davidson, a task for which he was peculiarly fitted by a rare combination of practical knowledge, both of seamanship and of the region concerned, and of critical acumen in the interpretation of historical sources. His paper, "Identification of Sir Francis Drake's Anchorage on the Coast of California in the Year 1579," published by the California Historical Society in 1890, was in part reprinted, together with the accompanying maps, in the *Bulletin of the American Geographical Society* (Vol. 40, 1908, pp. 449-469) on the occasion of the striking of the Drake medal by the American Numismatic Society, in an article by Mr. James D. Hague. The original source for this voyage is "The World Encompassed by Sir Francis Drake," based on the notes of Francis Fletcher, reprinted by the Hakluyt Society in 1854. Additional material is contained in Miss Zelia Nuttall's "New Light on Drake," likewise published by the Hakluyt Society (in 1914).

Halibut Fisheries of the Pacific Northwest. One of the most prompt commercial responses to the opening of the Grand Trunk Pacific Railway has been the diversion of the halibut trade to the port of Prince Rupert and the notable shipments made from that port to destinations in the east of the continent and in Europe (*Commerce Repts.*, No. 52, Washington, 1916; see also the note on "Canadian Fish for England," *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, p. 209). The sudden development of Canadian interests has aroused apprehension among the leaders of the American industry, for Seattle, long the headquarters of the fishery, is 500 miles farther away from the principal halibut fields. Ketchikan, the chief Alaskan center, is likewise filled with anxiety which can be dispelled only by a favorable railroad tariff. The Federal Government has endeavored to relieve the situation by locating new fishing banks nearer home. With this object the steamer *Albatross* was despatched with an expert crew to make a careful survey off the Washington and Oregon coasts. In an article entitled "From Herring to Halibut," Monroe Woolley (*Scientific American*, Vol. 114, No. 24, New York, 1916) relates the success of the undertaking. Several new fields were discovered, and from one of them nearly 1,000,000 pounds of halibut was taken during the 1915 season.

Exploration in the Yukon-Koyukuk Region, Alaska. That part of central Alaska lying between the Yukon and the lower course of the Koyukuk River, a right tributary, was until recently but little known. In 1913 it was explored by H. M. Eakin, and his results are presented in a report entitled "The Yukon-Koyukuk Region," recently issued as *U. S. Geological Survey Bulletin 631*. The region is essentially a rolling upland above which rise some higher mountain masses reaching altitudes of 5,000 to 6,000 feet. This upland is broken by broad valleys and lowlands. The mountain slopes are clothed with spruce trees up to altitudes of 2,000 feet. Spruce and birch also cover the lowlands. Above timber line the vegetation is chiefly moss. The timbered areas, notably in the lowlands, are broken by meadows covered with a luxuriant growth of grass. Moose, caribou, and bear still roam over much of this region, which is seldom visited by white men. No important mineral resources have been found in the Yukon-Koyukuk region, but many of the stream gravels carry some fine colors of gold. That some of these deposits are of commercial importance is shown by the fact that the placers of the Indian River district, which lie in the Yukon-Koyukuk region, have for several years been mined on a small scale. It is not improbable that other commercial placers may be found in the region, but the prospecting thus far done does not indicate the presence of any very rich deposits (*U. S. Geol. Surv. Press Bull. No. 294*.)

The August Forest Fire in the Ontario Clay Belt. The *October Review* (pp. 302-303) referred to the excessive burning off by the settlers of the forests in the clay belt of northern Ontario, the extensive area of cultivable land just north of the Laurentian-Hudson Bay divide which has recently been opened up by the Northern Transcontinental Railway. This practice has recently had a tragic result. On August 29 and 30, following an exceptional period of hot, dry weather, a conflagration broke out which ultimately affected an area of several hundred thousand acres, destroying a number of towns and settlements and causing the death of more than four hundred persons and the injury of many others. The greatest destruction was in the vicinity of Matheson, a town southwest of Lake Abitibi on the Temiskaming and Ontario Railway.

In number of lives lost the present fire is apparently the second most disastrous conflagration that has ever occurred in the North American forest zone, only the Peshtigo, Wisconsin, fire of 1871, when 1,500 persons lost their lives, having resulted in greater casualties. It ranks at least equal with the Hinckley, Minnesota, fire of 1894. For Canada it is by far the greatest disaster of its kind, far greater than the Porcupine fire of 1911, in the same region of the clay belt, in which 164 lives were lost. "The present fire is, to some extent, a secondary one, burning over territory on which the timber was

killed in 1911. This illustrates the well-recognized fact that the first fire does not consume the standing timber altogether but generally only kills it, leaving the scene ready for a still worse fire a few years later" (*Forestry Quarterly*, September, 1916, p. 539).

Power from Tidal Currents in the Bay of Fundy. The swift tidal currents in the Bay of Fundy have been used up to this time only by means of large reservoirs, one of which is kept at high-tide level, the other at low-tide level with power gates between. A new scheme is being devised for using the current direct, with storage provided only for the four periods in the day when the tidal flow ceases. The best location is believed to be at Cape Spit where the waters of the Minas Basin are narrowed to a few miles. In addition to this advantage is the lack of obstruction to navigation, the exceptional swiftness of the currents, high cliffs and a central position with respect to a large population. Within a radius of 100 miles is an urban population exceeding that of any city in Canada, except Montreal (H. S. Culver: *Power from Currents in Bay of Fundy, Commerce Repts.*, March 25, 1916, p. 1196).

New England and Appalachian Forest Reserves. Congress has appropriated \$3,000,000 for continuing the purchase during the next two years of forested lands at the headwaters of navigable streams in New England and the Southern Appalachians (*Amer. Forestry*, August, 1916, p. 473). Thus, after many vicissitudes, provision has been made for the continuation of the work so energetically carried on by the Forest Service during the last few years. The permanent good which this action insures is not to be measured in dollars, though the economic benefits are great. Permanent national forests under government control guarantees the protection of the two principal mountain groups in the East with all the value thereby implied in the way of health and recreation. Maps have been published in the Society's journal showing the regions where reserves have been made or were about to be undertaken (see, for New England, *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, p. 875; for the Southern Appalachians, *Geogr. Rev.*, September, p. 224).

This action of Congress also calls attention to the national park recently accepted by President Wilson under the title of the Sieur de Monts National Monument, the first of its kind to be established in the East. It is located on Mount Desert Island, includes some of the most beautiful scenery on the coast of Maine, and forms a unique gift to the nation (*U. S. Geol. Surv. Press Bull. No. 289*, September, 1916).

Federal Control of Hydro-Electric Power Resources. *The Nation* (January 20, 1916) comments on the passage of the Water Power Bill. The measure embodies one of the most vital concerns of internal development, the hydro-electric resources of the public domain. While the Federal Government has had authority over navigable streams, non-navigable waters have pertained entirely to the individual state and restrictive state legislation. Since the commencement of the period of rapid progress in 1900 much of the water power of the West has passed into the hands of large capitalists. Under the new law the small industries will have their opportunity and the public an increased enjoyment of benefits from this great national resource "on the most favorable terms compatible with prompt exploitation." The Southern States afford an example of widespread private control of hydro-electric resources. The distribution of the transmission lines of North and South Carolina, Georgia, Alabama, and Tennessee is indicated on a map and a list of controlling companies is given in an article in the *Bulletin of the Inland Waterways Association* for February, 1916. A fundamental report on electric power development in the United States has recently been issued as a Senate document, which will be reviewed in a forthcoming number of the *Review*.

The Discovery of Fossil Human Remains in Florida. At Vero on the Atlantic coast in central-eastern Florida human remains have been discovered during the past year and a report on them has been published in the *American Journal of Science* (July, 1916, pp. 1-18). The human remains were found in association with vertebrate, freshwater invertebrate and plant fossils which afforded a means for determining the age of the deposits. The results are of exceptional value since, in addition to a record of early man in America, there is available a record of the fauna and flora with which man was then associated. Careful sections through bedded deposits determined the fact that the human remains were found in a stratum whose continuations held the vertebrate remains. The other vertebrate remains included twelve species and represented the fox, deer, sloth, and mastodon. Five or six specimens represent extinct species. In addition, there have been found, in the older stream deposits, well-known fossils characteristic of the North American Pleistocene, such as the vertebrae and teeth of the large and

probably extinct crocodile, some bird and fish bones, and a considerable variety of turtles. The bones do not represent a human burial but were contemporaneous with the fauna with which they were found. The writer concludes that the small size of the streams which aggraded the surface above the bones and the thickness of the fresh-water marl which overlay them indicate a slow rate of deposition; and he holds that the bed in which the human remains were found was certainly deposited during the Pleistocene. The place in the geologic time scale of the fossiliferous beds overlying the human remains will be discussed after further study.

A New Fiber Plant in Cuba. This is not the first time that a weed has been turned to economic use—and ceased to be a weed. The latest is *malva blanca*, a plant that grows in Cuba. It has been especially troublesome to the tobacco planters of Pinar del Rio. In a region of good soil and abundant rain it grows to a height of twenty feet but usually does not exceed six to ten feet, with a stalk from a half inch to one and a half inches in diameter. It is anticipated that in time its fiber can be used to make at least part of the 20,000,000 sugar sacks annually needed in Cuba, and now imported principally from Calcutta and Dundee. Malva fiber is now sold at Havana, where it is used in making cloth shoes, and the supply is far below the demand (Garrard Harris: *A New Fiber Available in Cuba, Commerce Repts.*, Feb. 19, 1916, pp. 715-718).

EUROPE

Agriculture and the Decline of the Roman Empire. A causal relation between soil impoverishment and the downfall of the Roman Empire is presented by V. G. Simkhovitch in an exceptionally interesting article entitled "Rome's Fall Reconsidered" in the *Political Science Quarterly* for June, 1916 (Vol. 31, pp. 201-243). The testimony of ancient writers in proof of this contention is brought together, stress being laid on the gradual increase in acreage of farms as evidence of the farmer's impossibility to make a living on the seven-jugera (1 jugerum = $\frac{1}{4}$ of an acre) property of the early Roman period. The growing dimensions of country estates are given from the time of Tiberius Gracchus, when the Gracchan allotments were of thirty jugera each, to the assignments of the Augustinian colony of Emerita, which were of four hundred jugera. Between these two periods it is known that the triumviral assignments had been of fifty jugera, while under Caesar, the dictator, sixty-six and one-third jugera were awarded. The growth with time of agricultural property is therefore unquestionable. That this condition was due to the loss of fertility of the soil does not, however, follow necessarily, because estates become ampler as wealth is accumulated. The process is normal in every country and was not confined to Roman times.

Considerable importance is to be attached to a study of this type whenever economic facts of historical value are exhibited in their geographical setting. But to describe the Roman Empire on its wane as an abandoned farm on a gigantic scale, and attribute this condition principally to the depletion of humus in its soil, implies forgetfulness of the foreign agencies which contributed to the undermining of the empire. The invasions of barbarians from the north and the east would appear to some as having exerted as great an influence in the break-up of Roman world dominion.

The Roman Empire of Christian days was a complex organization when compared to the Latin state of the eighth century B. C. In other words it had progressed. The wants of its population increased not only in quantity but also in quality. The Roman farmer discovered that vines and olive trees paid better than grain. Sicily and the conquered coast of north Africa became the granaries of Italy. But, above all, the Roman had become a soldier and a leader, and it was natural that he should leave the less profitable occupation to the subjugated peoples.

The danger that too broad a generalization may become misleading is found in the citation of Greece as an earlier example of agricultural exhaustion. As an agricultural country, the dissected Greek area has always been a failure. Greece is a region of bays, gulfs, and islands and not of plains or valleys. The pre-Hellenic argonauts who sought the grain of Colchis were being unconsciously impelled by these features rather than by exhaustion of the soil of their country. They had very little arable land at their disposal. Furthermore, the lure of the sailor's life appealed more to the Greek mind than that of the unadventurous ploughman. As long as the steppeman of southern Russia or the Nilotic fellah was satisfied with the proceeds of unremunerative labor, he was made to provide for the bolder foreigner. And already in the day of Tiberius the Roman had learned the value of colonial enterprise.

The Fortieth Anniversary of the Madrid Geographical Society. The fortieth anniversary of the Real Sociedad Geográfica of Madrid was fittingly commemorated at

a special meeting held on March 27th of the present year. According to the account in the *Boletín* of the society for the second quarter of 1916, the session was opened by H. S. H. the Infante Don Carlos and addresses were read by officials of the Society and delegates from prominent scientific institutions in Spain and foreign countries. The secretary-general reviewed the society's activities and called attention to the studies in historical geography undertaken at various intervals. Among these are investigations dealing with the Roman province of Mauretania as well as important colonial studies relating to South America and a historical geography of Murcia. Problems of local interest, such as the revision of Spanish geographical nomenclature, are also engaging the attention of Spanish geographers. Lately considerable interest on the part of members has been centered on Spanish Morocco as an area of Spanish colonization and expansion. Among the works to be published under the auspices of the Society and which are now in preparation, mention should be made of the "Noticias del Perú" written by Lopez de Caravantes, Treasurer-in-Chief of the Indies (*Contador Mayor de las Indias*) and the celebrated "Islario" by Alonso de Santa Cruz.

The society has also made great efforts to promote the study of geography in Spain and to urge the desirability of establishing professorships for this purpose in universities and colleges. As a result of this movement, a chair of geography was established in the Escuela de Estudios Superiores del Magisterio, and teachers of geography were appointed in normal schools of the country.

AFRICA

Physical Geography of the Southern Algerian-Moroccan Frontier. A classification of this borderland into natural regions has been obtained by Francis Rey, a French army officer, by combining geological and geographical observations made in the course of explorations undertaken between the years 1910 and 1912 (*Recherches géologiques et géographiques sur les territoires du Sud-Oranais et du Maroc sud-oriental, Revue de Géogr.* Vol. 8, 1914-1915, 175 pp.). The area investigated embraces nearly 40,000 square miles and is included between the parallels of 30° and 33° N. and the meridians of 0° and 5° W. Three main regions are distinguished. The steppes and the Shott Tigri form the most northerly. The mountainous intermediate region of the Saharan Atlas follows, while a southern region comprises the zone of *hammadas*, or Saharan plateaus.

The steppe region has an altitude varying between 3,600 and 4,600 feet. Originally a folded area similar to the Saharan Atlas, it has been transformed into a number of desertic peneplains. These forms are shown to be the result of five successive cycles of erosion, characterized by a persistent conflict between eolian and alluvial agencies. The transition from this natural region to that of the Saharan Atlas occurs without a break. Mountain features merge insensibly into those of the desertic peneplain type.

The distinctiveness of the Saharan Atlas is due to structure. In the west the mountain region shades off into that of the Moroccan Atlas. The area investigated by Rey is subdivided into three sub-regions, namely, the Tamlelt elevated plain, the Ksur and Figuig ranges, and the Moroccan Ksur ranges. The Tamlelt plain lies at an average altitude of about 3,900 feet. Its greatest length strikes east-west. In places upon its sandy surface, saucer-like depressions with a clayey bottom form the sites of oases with sparse verdure. Life in the region is centered around these patches of green. Beyond lies the bare plain with its Saharan flora. The Ksur mountainous region presents the appearance of an elevated plateau supporting a system of roughly parallel ranges. The altitude of the intervening plains decreases from north to south. Thus the descent into the *hammada* zone follows in steplike sequence. The Figuig ranges differ from the preceding in geological character. Jurassic limestones almost exclusively compose the rock strata. The folding is of a distinct Alpine type with upturned anticlinals, whereas in the Ksur region it is Jurassic in character. The limestone foundation combines with the desertic climate to convert the region into a land of desolation.

South of the Atlas the *hammadas* form a region which has been subjected to powerful erosive agencies. Beginning at the end of the Tertiary successive layers of this desertic formation have been deposited. Their surface is devoid of life and conveys an excellent impression of the Saharan desert. As a rule they are slightly tilted toward the south.

Special mention of the influence of eolian action is made in the course of this study. It is shown that, while the wind has exercised a destructive action in the northern zones of steppes and mountains, its effects have been constructive in the southern *hammadas*, where thick layers of sand have been deposited over landforms modeled by river erosion. The sand dunes, or ergs, carved by the wind thus provide a system of forms due to eolian action which overlie a morphological series due to river erosion.

From an economic standpoint the region is one of meager resources. Sheep raising

constitutes the most profitable occupation on the plateaus, and hopes are entertained of the possibility of creating a dry-farming industry. Mining may become an important source of revenue in the Atlas country.

The Rainfall of Nigeria and the Gold Coast. A discussion of the rainfall of Nigeria and of the Gold Coast was read by Mr. C. E. P. Brooks before the Royal Meteorological Society (London) on February 16, 1916 (*Quart. Journ. Roy. Meteorol. Soc.*, April, 1916). The region investigated consists of the low-lying coastal area, including the delta of the Niger, and the interior plateau, merging into the desert and intersected by the valleys of the Niger and Benue Rivers. The rainfall data of Nigeria have been reduced to a common period of ten years, 1904-1913, and maps have been constructed showing the average distribution for each month and for the year. The annual rainfall ranges from about 160 inches on the coast to less than 10 inches on the north of the plateau. The monthly maps show a minimum in January, with a range from about 2 inches on the coast to almost rainless conditions in the north, and a maximum in June, with about 28 inches in parts of the coast and less than 2 inches in the extreme northeast. The belt of maximum rainfall advances inland during the first half of the year, reaching its most northerly position in August. In this month there are areas of less than 1 inch along the southeastern Gold Coast and in the southwest of Nigeria. In all months the effect of the low-lying valleys of the great rivers is apparent in producing a smaller rainfall than on the surrounding plateau. A special study of the rainfall and pressure observations taken at Zungeru, in the northern provinces of Nigeria, discloses a fairly regular progression in the correlation coefficients between these elements, from a high positive value in April to a high negative value in August, and back in October. The probable explanation is found in the annual migrations of the equatorial belt of low pressure and of the tropical highs, the source of the rainfall of Nigeria being the moist indraught which replaces the rising air in regions where the sun's rays fall vertically at noon. Popularly expressed, the "rain follows the sun." The oscillation of the pressure belt, with the consequent variations in the annual rainfall, appear to be the governing factor in the climate.

R. DEU. WARD.

ASIA

Carl Lumholtz's Return from Central Borneo. A despatch to the *London Daily Chronicle*, dated Batavia, October 2, and published in that paper's issue of October 4, a copy of which the Society owes to the courtesy of Mr. Herbert L. Bridgman, announces the return of Carl Lumholtz from his trip to Central Borneo, the plans for which were outlined at the time (*Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, p. 960). The route of the expedition lay up the Barito River, the largest of the south-flowing rivers, to its source, then across a secondary divide to the headwaters of the Mahakam River, which was descended to its mouth on the eastern coast. The expedition was primarily ethnological.

The Dutch government provided a lieutenant, a sergeant, and five native soldiers as an escort, as well as a surveyor and a photographer. After spending two months among the Dyaks of the Murung River, a side arm of the lower Barito, the expedition left the city of Bangermassin on December 9, 1915, on a government steamer. On reaching the limit of steam navigation, the party transferred to native boats manned by Malay boatmen. Later, in the headwater region, they were replaced by Dyak carriers. The Dyaks are the native inhabitants of Borneo; they have everywhere been pushed inland from the coast by the domineering Malays, who are much less reliable.

The expedition now reached the Busang River, one of the main sources of the Barito, in about the latitude of the equator. The current was very swift, especially during the excessive rainfall characteristic of February and March. Lumholtz reports having seen the Busang rise over six feet in a couple of hours. The stream is interrupted by a large number of rapids; these were circumvented by carrying boats and loads overland. Near the head of the Busang a number of natives were encountered from the Müller Mountains, a range forming part of the main divide of the island. The expedition crossed a secondary divide, however, at an elevation of 1,400 feet, which led to the Kaso River, a short source-stream of the Mahakam. The valley of this river is inhabited by Sapatans, a crude friendly people who, a hundred years ago, were mere cave-dwellers in the mountains to the east.

Continuing down the Kaso the expedition reached the Mahakam River. The upper Mahakam valley here trends east-northeast for about one hundred miles and at the eastern end of this stretch occurs a series of great rapids which constitute a formidable natural barrier. As a consequence, the Dyaks living in this part of the valley have hardly been touched by outside influences. The Mohammedan Malays, for instance, have never been able to extend their influence above the rapids. Recently the practice of head hunt-

ing has been suppressed by the Dutch, the last case of this kind in this region having occurred at least five years ago.

It was in this region that Lumholtz spent the greater part of his time. In spite of the objection of the natives, he was able to secure many photographs and cinematograph pictures and take the measurements of 174 individuals. Quite a comprehensive ethnological collection was made, including children's games and folklore and numerous short vocabularies.

After this sojourn, the rapids of the Mahakam were passed in safety in three days. Many Dyaks have lost their lives there, and only recently a foreign trader was drowned. The expedition arrived on August 22, 1916, at Samarinda at the mouth of the river on the eastern coast, having during nine months covered by river a distance of over one thousand miles in native boats and nearly half as much in the steamer.

A geographical result of the expedition is a map of the route which corrects previous errors, especially in the watershed region of central Borneo. The maps of this district are, of course, based only on reconnaissances. The Busang River region has been surveyed only within the last ten years. The best representation of this area and the remaining territory shown is the standard "Schetskaart van de Residentie Zuider- en Oosterafdeeling van Borneo," on the scale of 1:750,000, published in 1913 by the Topographical Bureau in Batavia. The most complete account of the physical geography of the Barito drainage basin is to be found in "Topografische en geologische beschrijving van het stroomgebied van de Barito, in hoofdzaak wat de Doesoelanden betreft," by G. L. L. Kemmerling (*Tijdschr. Kon. Nederl. Aadrijk. Genoot.*, Vol. 32, 1915, No. 5, pp. 575-641; No 7, pp. 717-774: listed in the February *Review*, p. 162), accompanied by a geological map, 1:750,000, based on the aforesaid topographic map.

Eastern Asiatic Expedition of the University of Pennsylvania Museum. In the June number of the *University of Pennsylvania Museum Journal* C. W. Bishop publishes a beautifully illustrated account of his recently completed journey in the Far East. The museum's Eastern Asiatic Expedition was a reconnaissance to determine the possibilities for archeological research over a wide area in the Orient. Commencing his surveys in the country centering round Nara and Kyoto, the nucleus of the early Japanese Empire, Mr. Bishop traveled over the border country, long disputed between the Empire and the aborigines, to Hakodate and thence to the island of Yezo. In the south of the island he visited modern Ainu settlements, remarking on the survival of such ancient features as the characteristic Ainu storehouse raised on piles above the ground and the Ainu interest in horse-raising. A later stage of the journey embraced Korea, where a favorable impression of the work of the Japanese government was obtained. Thence via the Liaotung Peninsula the author proceeded to Peking. Disturbed conditions in the upper valley of the Yellow River caused the abandonment of the original plan for study of the seat of the earliest Chinese civilization, and instead the journey was continued to Szechuan by way of the Yangtze River. The objective here was the famous caves in the sandstone hills of this western province. Native tradition attributes them to the work of the aboriginal barbarians. Mr. Bishop believes that this is correct and regards them as burial places.

POLAR REGIONS

Eskimo Migrations in Greenland. At Holstenborg, Greenland, well within the Arctic Circle, is one of the northernmost outposts of settlement and here V. C. Frederiksen, a resident missionary, has published a monthly journal, a volume of church hymns, a brief history of Greenland, and several literary translations, all in the Eskimo language, while at the same time carrying on archeologic investigations and making pastoral calls by dog sledge and kayak at the small native settlements scattered along three hundred miles of dangerous coast. Pastor Frederiksen, in another monthly journal called *Atuagagdliutit*, or "Reading Miscellany," published at Godthaab, Greenland, has expressed some very interesting views on Eskimo migrations according to an abstract by James Mooney in the *Journal of the Washington Academy of Science* (Vol. 6, 1916, No. 6, pp. 144-146.) The evidence of linguistics, geography, and archeology led him to conclude (1) that the Eskimo tribes reached Greenland from an original nucleus in the extreme west, (2) that they traveled southward along the coast to the east, and (3) that they decreased in number toward the north owing to the scarcity of game and building material. He believes that the Norse occupation about 1000 A. D. made a wedge between the east and west coast Eskimo and that natural communication was again established only after the extinction of the Norse colony about 1490. Some of the northerly tribes on the east coast starved to death; some of the southerly tribes were saved from a like fate at a later period only by contact with Danish colonists. The

superior capacity for civilization of the South Greenland Eskimo is explained by a strain of old Norse blood.

Glacial Features of the South Orkneys. Position near the edge of the Antarctic confers upon the South Orkneys special interest as a field for glacial study in relation to other South Polar regions. Advantage of this was taken by the Scottish National Antarctic Expedition which spent eleven months in 1903-04 on Laurie Island, the most easterly of the group (J. H. Harvey Pirie: *Glaciology of the South Orkneys*, *Trans. Royal Soc. Edinburgh*, Vol. 49, Part 4, Edinburgh, 1913). The South Orkneys appear as the remnant of a sunken and dissected upland with a latitudinal extent of 72 miles. Extensive glaciation at a time when the land stood at a much higher level accounts for the broad topographic expression now owing its detail to subaërial weathering. In this region the theoretical or climatic snow-line is probably some little distance above sea-level. The configuration of the land produces a number of more or less isolated ice sheets centering in roughly concentric form about the heads of the bays. The glaciers belong to the class first described by Arctowski as "suspended coastal glaciers" and later defined by Nordenskjöld as "ice-foot glaciers." For purposes of description they may be divided into three integral parts. The high slopes are sometimes distinguished from the main body of the glacier occupying the slope between the hills and the sea by a well-marked *bergschrund* which conforms rather closely to the configuration of the underlying surface. In these glaciers, unfed by snow fields, the snow passes directly into névé and glacier ice, a phenomenon assisted by the comparative frequency with which the mean day temperature of the air rises above freezing point. The glaciers end in snouts or in terminal cliffs. Observations on the snout glaciers show that the ice is either stationary or retreating slightly. Those reaching the sea terminate in regular cliffs ranging in height from 60 to 160 feet and affording good opportunity for the study of internal glacial structure.

PHYSICAL GEOGRAPHY

Breathing Wells. The "breathing" of wells has often been noted, and the relation between the inflow and outflow of air at the mouth of wells and the atmospheric pressure has at the same time been observed. Yet observations of this interesting phenomenon are not common. In a recent number of the *Monthly Weather Review* (Vol. 44, 1916, pp. 75-76) there are given the daily records of the "breathing" of a well at New Carlisle, Clark County, Ohio, during February, 1916. Rising pressure changes were accompanied by inspirations in 22 cases, and by no breathing in 4 cases. Falling pressure changes were accompanied by expiration 27 times, and by no breathing twice. A practical use of this breathing has been suggested in England, where private efforts have been made to utilize these conditions in forecasting probable gas explosions in mines. In the United States, the Weather Bureau authorizes its local forecasters to telegraph marked pressure changes to mine operators and thus enable the latter to form their own opinion as to the probability of danger.

R. DEC. WARD.

Tropical Rains: Their Duration, Frequency, and Intensity. Tropical rainfalls are said to be intense, yet they are often exceeded by summer showers in middle latitudes. This is true, at least, for the rainfall of Baltimore, Maryland, compared with that of San Juan, Porto Rico, as is shown by Dr. Oliver L. Fassig in the *Monthly Weather Review* for June, 1916 (Vol. 44, pp. 329-337). The average duration of rains is eight hours in Baltimore, and one hour in San Juan. But the duration and frequency of excessive rains is the greater in the tropics. A consideration of the frequency of small rains shows that the tobacco sections of Porto Rico are located where rains of less than 0.1 inch are very numerous (as at Caguas, 160 a year); and that in one of the best coffee regions, in the western mountains, there are few days with such small amounts (for instance, Lares, 13). The average total rainfalls of the two places are about 70 and 100 inches respectively. The heavy rains come during the hurricane season, June to November, and in winter when the extra-tropical cyclones reach south to the island. The diurnal maximum of rainfall occurs shortly after noon at San Juan with a secondary high point at six in the morning. The afternoon rains are more intense but less frequent than the morning rains. The article is well illustrated with diagrams. One of the most striking is that of "rain autographs." Doctor Fassig's ingenious instrument, which records the duration of rainfall, allows the raindrops to make their own record by blurring the ink on a moving paper exposed under a small opening. In this way, rainfall too small to measure may leave its mark at the proper time. The autographs of San Juan show at a glance the usual intense, abrupt character of the tropical rainfall, while selected ones from Baltimore show both the heavy showers and the weaker long-drawn-out general rains of middle latitudes.

CHARLES F. BROOKS.

HUMAN GEOGRAPHY

Deserts Due to Deforestation. A popular but inaccurate account of the relations between forests and rainfall appears in a recent article by Moyer Wicks (*Amer. Forestry*, October, 1916, pp. 598-606). This type of exaggeration of the effects of deforestation really harms the cause of forestry. Witness the following:

"It is certain that the arid lands we have in North America have been made so by the extermination of the trees through forest fires and, possibly, the destruction of trees for fuel and clearing for cultivation by the great prehistoric agricultural people who preceded the nomadic Indians."

"Palestine, now but a memory and a shrine, was at one time the most productive section of the ancient world, crowded with cities and villages."

"Utah illustrates the same scientific truth, but conversely, for the Mormons, who found the country treeless, have nearly doubled their annual rainfall, and have largely increased the size of their lakes and streams by planting orchards and by reforestation."

"Every intelligent man of mature years will recall instances, within his own observation, of diminution of rainfall going hand in hand with diminution of tree growth in the same locality—a steady decrease in regularity and amount of rainfall being perceptible wherever the forests have been devastated by man."

"Greece now supports only 5 per cent of the population it had when it produced sculptors, poets, orators, philosophers, statesmen and soldiers, whom modern times have not surpassed. Indeed, all the coast that abuts upon the Mediterranean suffers more or less from the practices that consign the treeless country to aridity."

The Increased Importance of Silver. A change in the economic status of silver is imminent. Within the last three years output has been reduced and within the last few months demand for coinage purposes has been increased. In 1912 the world production was over 224,000,000 ounces; in 1915 it was 13,000,000 ounces less (*The World's Production of Silver in 1915, Mining and Engineering World*, Feb. 6, 1916). The diminution is chiefly accounted for by the decline of mining in Mexico. Yet despite internal troubles this country still produces about 30 per cent of the world's supply. Production in the United States increased, the greatest advance among individual states being shown by Idaho. The whole country accounted for 36 per cent of the world's total. A proportionally greater increase was made by South America. During the year copper and tin mining became very active in Peru and Bolivia, and consequently the output of silver commonly obtained as a by-product was augmented. The increased demand for silver is attributable to the war. From the circulating currency of the belligerent nations gold has either been withdrawn or reduced in amount and the increased paper currency must rest largely on silver security. The recognition of this growing importance of silver is world-wide. To meet the shortage of silver coin Australia has established a federal mint. Although India, the largest consumer of silver for coinage purposes, reduced her usual demands at the beginning of the war, she must shortly reappear as a large-scale purchaser. Russia has been buying silver extensively in China and having it minted in Japan, a fact that recalls another feature of the situation, viz.: the proposed currency reform in China. The deplorable results ensuing from the depreciated paper money issued during the early stages of the revolution have led to a movement towards standardization of the monetary system. As it is, the silver money of China and Manchuria today has purchasing value 50 per cent greater than that of two years ago. A United States consular report (No. 130, June 3, 1916) instances the rapid rise in the case of the latter country. At the beginning of April of the current year the value of the silver yen was equal to 0.955 Japanese gold; at the end of the month it had risen to an equivalent of 1.03 gold. Such a situation should favorably affect the import trade of the country.

GEOGRAPHICAL NEWS

Anthropogeographical Models at the Children's Museum of the Brooklyn Institute. The Children's Museum of the Brooklyn Institute of Arts and Sciences about a year ago installed a series of six geographical models which will doubtless go far in arousing an interest in geography among its visitors and in helping them to visualize distant environments. Each model portrays some characteristic episode in the life of the inhabitants of the region it represents. The subjects of the models are as follows: (1) Brazilian Indian hunting monkeys with a blow-gun in the tropical forest, (2) South Sea islanders dragging their boat out of the surf after a fishing trip, (3) Bushmen hunting kangaroos in the Central Australian desert, (4) Masai (British East Africa) attacking a lion that has leaped over the barricade of one of their villages

and seized a sheep, (5) Bedouins at an oasis in the Sahara welcoming a Berber traveler, (6) Afghan mountaineers stalking villagers tilling their fields in the valley below. The models aim to render faithfully the aspects of the environment they represent; their plasticity heightens the realistic effect. The models, which are enclosed in cases with a front panel of glass, are small in size, some three feet wide by two feet high, the human figures being about five or six inches high. They were executed by Mr. Dwight Franklin, who has made several collecting trips for the American Museum of Natural History.

PERSONAL

PROFESSOR J. W. BEWS of Natal University College, Maritzburg, read a paper entitled "An Account of the Chief Types of Vegetation in South Africa, with Notes on the Plant Succession" at the fourteenth annual meeting of the South African Association for the Advancement of Science, held at Maritzburg from July 3 to 8.

DR. HENRY J. COX of Chicago spent the month of July in the orchard regions of the mountain slopes of western North Carolina, inspecting the special meteorological stations that are reporting the temperature, humidity, and rainfall conditions in connection with a five-year research which closes at the end of this year. Doctor Cox has charge of the project for the Weather Bureau, and the work is being done in co-operation with the State Board of Agriculture of North Carolina.

DR. ALBERTO EDWARDS has succeeded to the directorship of the Oficina Central de Estadística of Chile on the death in Santiago on June 28 of the preceding director, Don Valentín del Campo.

DR. CARLOS CURT HOSSEUS, late inspector of agricultural engineering of the Argentine Department of Agriculture, spoke on June 30 before the Academy of Sciences of Buenos Aires on that part of the Argentine Andes lying to the west of the Nevado de Famatina in the provinces of La Rioja and San Juan, Argentina. Doctor Hosseus has recently been elected a member of the Academy of Sciences of Córdoba, Argentina.

MR. HERBERT LANG of the American Museum of Natural History gave a lecture on "The Faunal Relations of Central Africa" before the New York Academy of Sciences on October 9.

PROFESSOR B. E. LIVINGSTON and DR. H. E. PULLING, of the laboratory of plant physiology of Johns Hopkins University, spent August and September in making an ecological reconnaissance of the region north of the new Hudson Bay Railway, in northern Manitoba. Their studies extended from Pickitonay (mile 187 from The Pas) down the series of rivers and lakes leading to the Nelson River below the grand rapid, thence down the Nelson to Split Lake and across the latter to its northern shore, thence back up the Nelson to the Manitou rapid (mile 214 from The Pas).

MR. STEPHEN T. MATHER, secretary to Franklin K. Lane, Secretary of the Interior, spoke on "Our National Parks" at the post-vacation luncheon of the Geographic Society of Chicago on October 28.

MR. F. E. MATTHES of the U. S. Geological Survey has recently returned from California, where he devoted the summer to a comparative study of the Hetch Hetchy and Yosemite Valleys.

PROFESSOR B. L. MILLER of Lehigh University read a paper on "Geological Observations in the Andes of Peru and Bolivia" before the New York Academy of Sciences on October 16.

MR. W. B. NELSON of the Brooklyn Manual Training High School will give a course in physiography in the School of Pedagogy, a university extension department, of the Brooklyn Institute of Arts and Sciences. The course will consist of thirty sessions of one hour each, with an occasional half hour of laboratory work, on Wednesday afternoons at 4.15, beginning on October 4, at the Brooklyn Academy of Music.

PROFESSOR GEORGE E. NICHOLS of the botanical department of Yale University spent the month of August on ecological investigations in northern Cape Breton Island.

PROFESSORS HEINRICH RIES and R. E. SOMERS of the department of geology of Cornell University were engaged during the past summer in continuing their investigation of the clay deposits of Virginia for the Virginia Geological Survey.

DR. RUDOLPH R. SCHULLER, who has recently been investigating South American manuscripts in the library of Northwestern University, has discovered a large unknown tract on the language of the Moseten Indians of northeastern Bolivia. The author of the work was an Italian Franciscan missionary, named Benigno Biboitti. The manuscript consists of 85 large folio pages containing a vocabulary of 2,500 words in

Moseten and Spanish, a grammatical essay and a religious treatise. Most remarkable of all is the fact that there are three discourses entirely in Moseten.

The Moseten language is one of the least known of the aboriginal idioms of Bolivia and the linguistical position of these Indians is still unknown. While a little has been previously published relating to this language, there has never been sufficient material to do very much, and hence this manuscript will be of the greatest aid in solving many perplexing questions relating to this branch of Indians.

Dr. Rudolph R. Schuller is an Austrian scholar who has spent perhaps twenty years of his life in South America. For a long time he was connected with the Museu Goeldi at Para in Brazil. Doctor Schuller is known for his edition of Félix de Azara's "Geografía Física y Esférica de las Provincias del Paraguay," published in Montevideo in 1904.

Mr. T. R. SIM of Pietermaritzburg read a paper on "Commercial Afforestation in South Africa" at the fourteenth annual meeting of the South African Association for the Advancement of Science held at Maritzburg from July 3 to 8.

MR. CHARLES R. TOOTHAKER, curator of the Philadelphia Museums, gave a lecture on the Danish West Indies before the Geographical Society of Philadelphia on November 1.

OBITUARY

PROFESSOR CLEVELAND ABBE, the dean of American meteorologists, died on October 28 at Chevy Chase, Md., at the age of 77. His early work was devoted to astronomy. In 1869, the year after his appointment as director of the Cincinnati Observatory, he suggested to the Chamber of Commerce of that city the desirability of collecting and comparing telegraphic weather reports from all parts of the country with a view to making forecasts. This proposition was accepted, and on September 1 he began the publication of daily weather reports. The project was received with such favor that it was brought to the attention of Congress, and on February 4, 1870, a meteorological service was established by joint resolution and put under the jurisdiction of the Chief Signal Officer of the army. The next year Abbe was appointed meteorologist of the Signal Service and in February began the publication of tri-daily reports and forecasts. For the first year he did in person the work of collating and tabulating, until competent assistants could be trained. In 1891 the Weather Bureau was created under the Department of Agriculture and became the official meteorological service of the government. From that date to his death Professor Abbe continued his connection with the Bureau. He was editor of the *Monthly Weather Review* from 1872 to 1915, when advancing years caused him to transfer his duties to his son, Cleveland Abbe, Jr., as acting editor. From 1909 to 1913 he was editor of the *Bulletin of the Mt. Weather Observatory*. Professor Abbe also occupied two academic positions, viz., as professor of meteorology at Columbian (now George Washington) University from 1886 to 1905 and as lecturer on meteorology at Johns Hopkins University from 1896 to 1914. The following are the most important among Professor Abbe's publications:

Report on Standard Time, 1879, which started the agitation that resulted in the modern standard hour meridians from Greenwich; Treatise on Meteorological Apparatus and Methods, *Appendix 46, Annual Rept. of Chief Signal Officer for 1887*; Preparatory Studies for Deductive Methods in Storm and Weather Prediction, *Appendix 15, Ann. Rept. Chief Signal Officer for 1889*; Short Memoirs on Meteorological Subjects [first collection of translations], *Ann. Rept. Smithsonian Institution for 1877*, pp. 376-478; The Mechanics of the Atmosphere, A Collection of Translations [second collection], *Smithsonian Misc. Coll. 843*, 1891; Third Collection, *Smithsonian Misc. Coll.*, Vol. 51, No. 4, 1910; A First Report on the Relations between Climates and Crops, *U. S. Weather Bureau Bull. 36*, 1905.

CAPTAIN SAMUEL W. BARTLETT died on September 9 at Brigus, Newfoundland, his birthplace and lifelong home. Captain Bartlett had been master of the *Windward, Erik*, and other Peary auxiliary steamers, and later of the *Neptune* of the Canadian Government Expedition to Hudson Bay under Dr. A. P. Low in 1903-04.

PRINCE BORIS GALITZIN, director of the Meteorological Service of Russia since 1913 and professor of physics in the University of Petrograd, died May 4 at the age of 64. Prince Galitzin is best known for his work in seismology, particularly in the locating of earthquake epicenters from the records of a single station.

PROFESSOR CHARLES S. PROSSER, head of the department of geology in the Ohio State University, died suddenly in Columbus on September 12 at the age of 56. Professor Prosser had been connected with the geological surveys of Kansas, New York, and Ohio.